

# PATENT SPECIFICATION

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## (54) A SAFETY CLOSURE FOR BOTTLES

(71) We, PROT S.R.L. of 2, Via Bianca di Savoia, Milan, Italy; an Italian body corporate, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns a hermetic safety closure for bottles and the like, in particular for fizzy drink bottles, said closure comprising a cap, which can be screwed onto the threaded bottle neck, and having a safety ring which is formed integral with the lower end thereof, and can be torn off along a parting line defined by notches.

In a hermetic safety closure of the previously stated type, the first unscrewing of the cap can be performed only after the safety ring is torn off therefrom along said parting line.

Already known are many types of sealing closures, the application of which usually requires two separate steps, i.e. the cap is firstly screwed down, whereupon the safety ring is deformed or shrunk, so that it is firmly engaged with an annular bead on the lower end of the threaded mouth of the bottle. Thus, as may be readily appreciated, the cap can be unscrewed only after the safety ring is broken or severed.

The severing of the safety ring is usually obtained by the fact that it is firmly secured to the bottle neck; thus when the cap is unscrewed, a relative rotary motion is caused between said two components, which results in a breakage along said parting line.

In already known safety sealing closures, mutually engaging projections and recesses are formed on the safety ring, and on the bottle mouth, to prevent rotation of said ring on said mouth. However, various drawbacks occur in such sealing closures; e.g., the safety ring often slides about the bottle mouth when the cap is being unscrewed, with consequent failure to sever the ring from the cap, or difficulties in the breaking of the seal. In such cases, a con-

siderable effort may be required to remove the cap, or a knife may be required to have the safety ring broken or severed, with consequent possibility of deforming or even destroying the cap, which therefore can no longer be utilized for a subsequent non-sealed closure of the bottle.

A further drawback which is often encountered in the already known safety closures, consists in the difficulties to be overcome in the unscrewing of the cap, due to excessive adhesion thereof on the mouth of the bottle, which drawback occurs above all when sweet drinks are bottled, resulting in a tendency to cause the cap and sometimes even the safety ring to stick on the mouth or neck of the bottle.

It is an object of the present invention to provide a safety closure which can be applied in a single screwing step, which results in a simplification and quickening of bottling operations, and to attach said closure to a bottle or the like in such a way that an easy and trustworthy undoing of the safety closure is ensured, even in the case of a strong adhesion of the cap, and possibly also of the safety ring to the mouth or neck of the bottle, particularly in the case of sweet drinks.

Another object consists in establishing an efficient connection of the safety ring to the bottle neck, whilst ensuring that said ring can be easily and reliably severed from the cap, when this latter is turned for the opening of the bottle.

According to the present invention there is provided a closure for bottles or the like containers having a neck with an upper portion threaded in one direction and a lower portion of larger diameter than said upper portion threaded in the opposite direction, comprising a prethreaded cap with a top part and a bottom part separated by a frangible zone, said top and bottom parts being formed with threads complementary to those of said upper and lower portions, respectively of the neck of the container

with which they are to be associated, and at least said bottom part being made of elastic material to attain resilient expansion and contraction around said lower portion during fitting of said cap onto said neck by screw threading motion; said bottom part having an internal peripheral shoulder for guiding the threads of said bottom part over the threads of said lower portion during said screw-threading motion.

The advantages ensured by the invention consists in particular in the fact that the cap, along with its safety ring, can be applied to the bottle mouth by a single screwing down operation, whilst, when said cap is unscrewed, the safety ring is simultaneously screwed even more tightly onto said second screw-threaded portion, being thus axially drawn away from the cap. The severing of the safety ring from the cap is thus considerably assisted since, in addition to tangential stresses, tending to cause shearing all along the frangible zone or parting line, axially directed tensile stresses are also brought about (due to the drawing of the cap way from the ring), which contribute to said severing.

A further advantage is due to the possibility of simultaneously turning both the cap and the safety ring, when the bottle is being initially opened, thus allowing a very high torsional force to be exerted to sever the safety ring and to unscrew the cap, even in cases when said cap is firmly jammed on the mouth of the bottle.

The invention will be further illustrated, by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 is a side view of a bottle neck, shaped for the application of a safety closure according to the invention;

Fig. 2 is a cross-section, taken on the line II—II of Fig. 1;

Fig. 3 is a partial axial section of the bottle neck as shown in Figs. 1 and 2;

Fig. 4 is a partial sectional side view of a cap with its safety ring, that can be screwed onto the bottle neck as shown in the preceding Figs;

Fig. 5 is a partial axially sectional view of a safety closure according to the invention, already applied to a bottle; and

Fig. 6 is a side view of a modified embodiment of a cap, along with the related safety ring.

As illustrated, the neck 1 of a bottle has its upper portion formed with a first screw thread 2, and with an annular bead 3, present at the lower end of said screw thread, and the axis of which coincides with that of the neck 1. Formed on said annular bead 3 is a second screw thread 4, which slightly protrudes over the screw thread 2. The two screw threads 2 and 3 are co-axial

with one another, but are oppositely directed.

The screw thread 2 is preferably single-threaded, whilst the screw thread 4 is multiple-threaded, e.g. six-threaded, as shown at 4a in Fig. 2. The convolutions of thread 4 are thus conveniently inclined, so as to facilitate the application of the safety ring, as explained hereinafter, and to promote the engagement of said ring with said screw thread.

The inner thread 5 of cap 6 is engaged with the screw thread 2. A safety ring 7, extending from the lower edge of said cap, is in turn formed with an inner screw thread 8, designed to engage with said screw thread 4 of bottle mouth 1.

The safety ring 7 is defined by a parting line 9, connecting the ring to the cap 6, and formed by spaced notches, between which connecting webs 10 are left at equal spaced intervals over the whole circumference. Thus, the cap 6 can be torn off from the ring 7.

The cap 6 and the ring 7 can be advantageously integrally injection moulded from a suitable resilient plastics material, with the related screw threads 5 and 8 pre-formed.

A narrow inner collar 11 integrally formed on the lower edge of safety ring 7, to serve as a guide, for promoting the engagement of ring 7 with the screw thread 4, when the cap is being applied. After such application, said collar 11 is located below the bead 3 of mouth 1 (see Fig. 5).

Finally, an annular projection 12 is formed inside the cap 6, so as to define an annular seat into which the end 1a of mouth 1 is engaged.

The cap 6 is locked on the bottle mouth 1 by having it tightly screwed thereon, whilst the safety ring 7 is forced onto the screw thread 4, whereby it becomes slightly widened and winds round said screw thread 4 while descending thereon. In this step, the ring 7 is turned together with the cap 6, and engages with said screw thread 4 in a direction opposed to that of said thread. This is possible due to widening of ring 7 (and to the elasticity of its material) while the multi-threaded design of screw threads 4 and 8 results in easier insertion.

The application of the safety closure according to the invention can be advantageously performed by a single screwing-down step, by already known automatic bottling machines.

After such application, the bottle can be opened only after the safety ring 7 has been broken or severed. By unscrewing the cap 6, the ring 7 is simultaneously screwed further on its screw thread 4 (since the screw threads 2 and 5 are opposed to screw

threads 4 and 8), whereby the ring 7 is instantly severed from the cap 6. As a matter of fact, when the cap 6 is being unscrewed, it is moved upwardly, as indicated by the arrow A in Fig. 5, whilst the ring 7 being screwed down on its screw thread 4, is axially forced downwardly, in the direction of arrow B in Fig. 5. In other words, the cap 6 and the ring 7 are axially drawn away from one another, thus tearing the webs 10 by which they are connected. To that axial action, a tangential stress is added, which contributes to the breaking of said webs 10.

It may be observed that the tearing occurs when the cap 6 and the ring 7 are turned in the same direction whereby, when required, instead of unscrewing the cap 6 only, the ring 7 can be also acted upon, thus exerting a greater torsional force. Even caps which have jammed can be thus easily unscrewed. The safety closure according to the invention is also particularly suitable for very large bottle mouths, which, as well known, are particularly difficult to open, owing to powerful frictional forces which have to be overcome. Finally, it is possible to sever the ring 7 by acting thereon only, i.e. by screwing it down on its screw thread 4.

After the severing of ring 7, the cap 6 can be wholly, unscrewed, and can then be utilized for a further non-sealed closing of the bottle, by screwing it on its screw thread 2.

The safety ring 7, after having been severed, is left on the neck of bottle. Then, according to a modified embodiment, as shown in Fig. 6, in order to permit easy removal or breaking thereof, even when the cap 6 is being unscrewed, said ring can be weakened in any point thereof, e.g. by a hole or notch 13.

#### WHAT WE CLAIM IS:—

1. A closure for bottles or the like con-

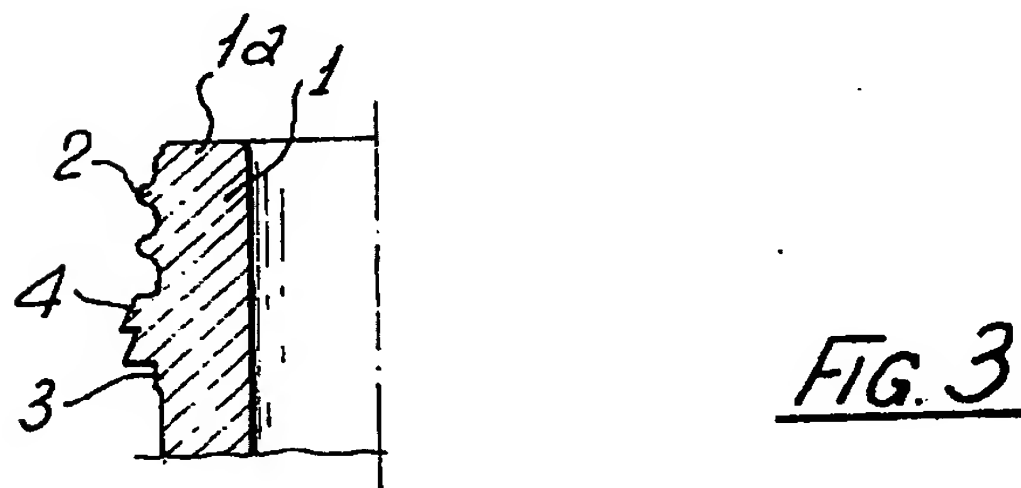
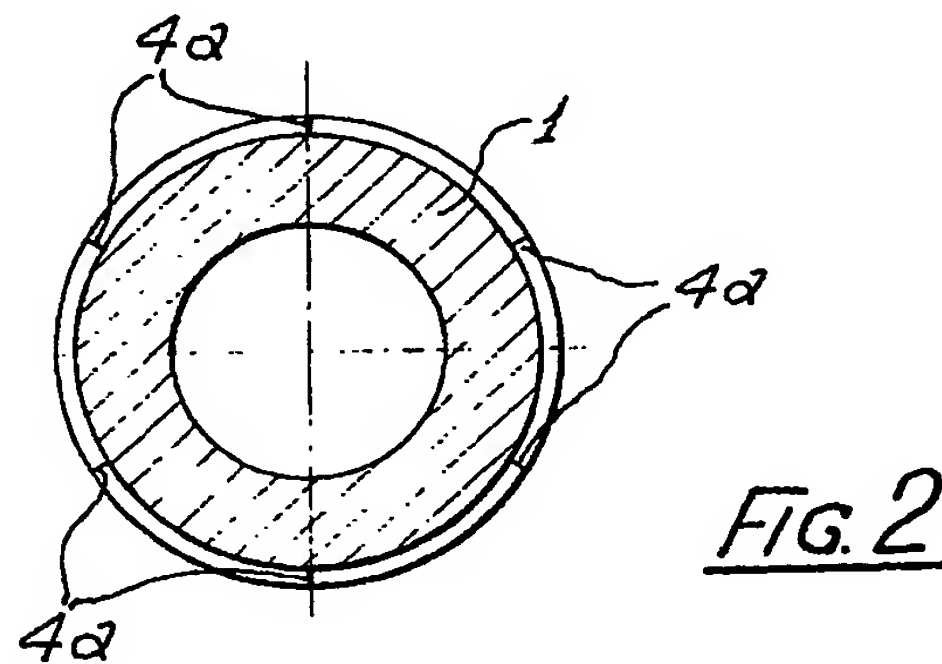
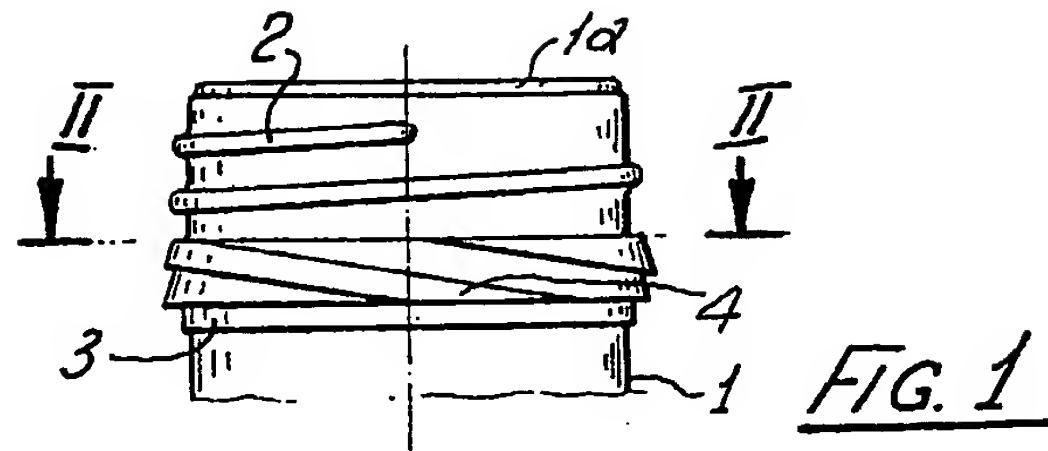
tainers having a neck with an upper portion threaded in one direction and a lower portion of larger diameter than said upper portion threaded in the opposite direction, comprising a prethreaded cap with a top part and a bottom part separated by a frangible zone, said top and bottom parts being formed with threads complementary to those of said upper and lower portions, respectively, of the neck of the container with which they are to be associated, and at least said bottom part being made of elastic material to attain resilient expansion and contraction around said lower portion during fitting of said cap onto said neck by screw threading motion; said bottom part having an internal peripheral shoulder for guiding the threads of said bottom part over the threads of said lower portion during said screw-threading motion.

2. A closure as claimed in claim 1, in which said second screw thread is of the multi-thread type.

3. A closure as claimed in claim 1 or 2, in which the safety ring is formed with a weakened point, by which it is broken, while the cap is being unscrewed or thereafter, for the removal thereof from the bottle.

4. A closure for bottles and the like, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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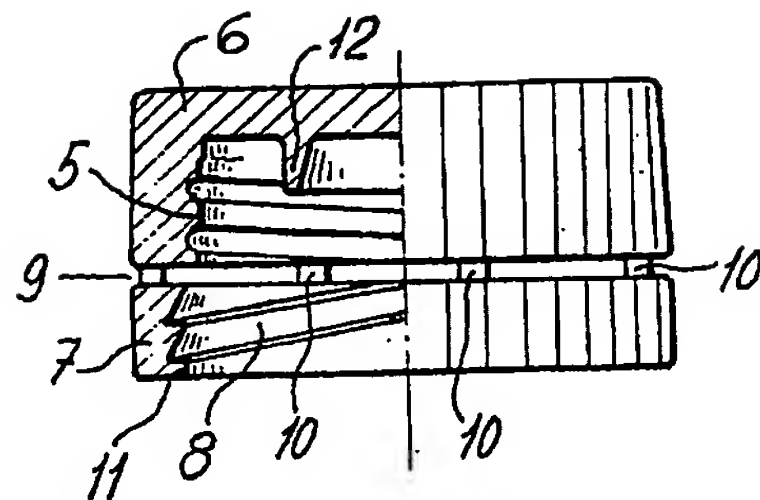


FIG. 4

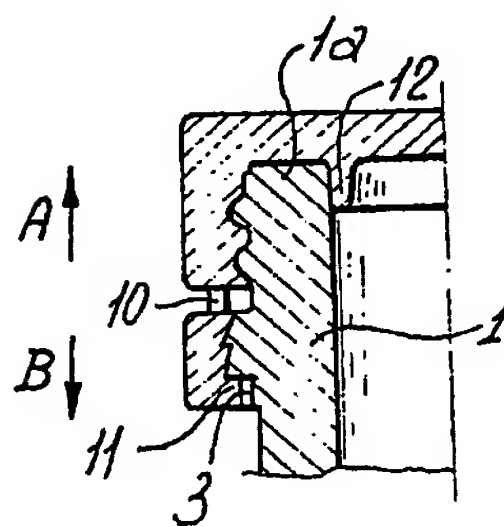


FIG. 5

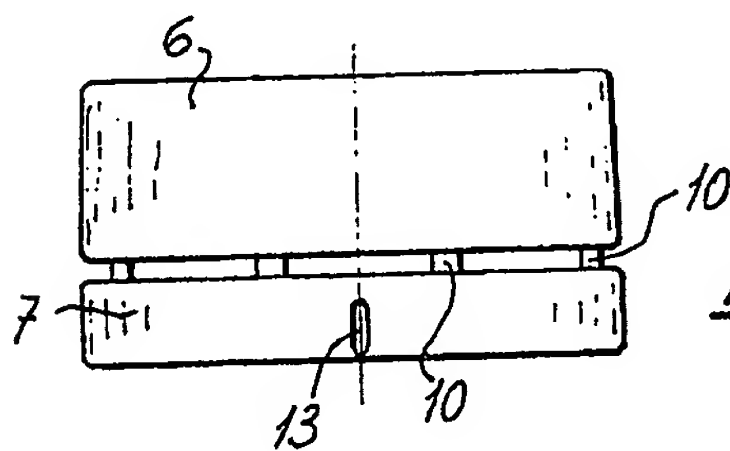


FIG. 6